

## Accelerator Systems Division Highlights Ending May 27, 2005

### Installation

Craft Snapshot 5/24/05

ASD productive craft workers	<b>63.0</b>
Foremen (Pd by 15% OH)	7.0
AMSI management (Pd directly)	3.0
TOTAL AMSI WORKERS	76.0
Less WBS 1.9, 1.2 etc	<b>12.0</b>
Less absent	<b>2.0</b>
TOTAL PD BY ASD/ORNL DB WPs	<b>49.0</b>

### Accelerator Physics

#### Operations

- Supported operation of DTL systems for RCCS Modeling and tuning
- Supported Operation of SCL Cavities for RF measurements and processing
- Provided 2 FTEs for in vacuum installation of warm sections
- Dodson, Giannella and Kursun attended the Workshop on Accelerator Operations 05 hosted by Fermilab. Dodson was elected to the Workshop on Accelerator Operations International Committee

#### Ion Source

- The improved ion source performance was presented in an oral presentation at PAC'05. A poster presented the optimization of our emittance scanners.
- Jens Peters from DESY visited us for 4 days that were filled with discussions and ion source testing.
- The two-temperature-collar source produced 50 mA average current of the 1.23 ms long pulses when operated at 40 Hz. The emittance remains to be determined.
- A new source with a low-power external antenna was successfully started up with a low-power 2 MHz discharge.
- Ion source staff from ORNL, FNAL, DESY, and LBNL agreed to test the DESY source with 1.23 ms and 3 ms long pulses using the SNS 2 MHz amplifier that still resides at LBNL.

### Survey and Alignment

#### SCL:

Continue diagnostic laser pipe survey.

LEDPS base plates set.

Laser pipe survey fixture fiducialized.

WSR1 laser box re-aligned.

WSR4 laser box re-aligned.

CM5 laser pipe adjusted.

CM22 re-aligned.

#### HEBT:

Re-align HEBT Quads QH04, QV05, QH06, QV07, QH08.

Re-align LINAC dump quads QV06, QH05, QV04.

Set QH10 stand for elevation.

#### RING:

Re-align doublet QHD10-QVD11.

Map upstream diagnostic components in RF straight section.

#### RTBT:

RTBT network observations.

8 Bolt holes set out.

#### Magnet Measurement:

21Q40\_50/DCH37 coupled.

21Q40\_59 fiducialized.

21Q40\_38/DCV33 coupled.

21Q40\_57 optically aligned.

**Mechanical****Magnets**

- There are now five 21Q assemblies installed in the RTBT. A sixth assembly is complete and ready for installation.
- I have chosen four matched 21Q's for the RTBT. We are mapping another one now.
- We moved warm sections 21 & 22 out and back in this week.

**Water Systems Installation**

- Installation of the Ring Injection SS kicker magnets cooling connections continued.
- Installation of the Ring Collimator remote cooling connections continued.
- Fabrication of the RTBT Collimator Closed loop System continued.
- Modification of the RFTF Klystron cooling system to accommodate the new Thales 2.5 MW klystron was started.
- Preventative Maintenance on the Linac water systems continued.

**Ring Systems Installation**

- The HEBT collimators' remote clamp installation was completed.
- The HEBT 12Q45 magnets adjacent to the collimators were reinstalled and reconnection of services is in progress.
- The HEBT 12Q45 magnet QH10 was installed and connection of services is in progress.
- The Injection SS magnets' connection of services is in progress.
- The Injection SS foil changer support structure was installed.
- The Collimator SS Primary Collimator shielding installation was completed.
- The Collimator SS Primary Collimator and scraper assembly was installed.
- The Extraction SS Lamberton Magnet was installed.
- The Extraction SS BIG diagnostic was installed.
- The RF SS vacuum installation was completed and leak checked.
- The vacuum installation on all 4 arcs was completed and leak checked.
- The RTBT Bend Magnet 17D224 was installed.
- The RTBT 21Q40 magnets QV01 and QH02 were aligned.
- The RTBT 21Q40 magnets QH08, QV07 and QH06 were installed.
- A shipment of miscellaneous power, diagnostic and vacuum components from BNL was received and distributed.

**Electrical Group**

- The last 4 Ring Medium Power Supplies have been delivered. All ASD magnet power supplies have now been installed.
- The PFN cable pulls have been completed, as well as the corrector cable pulls in the RTBT. All ASD magnet cable pulls have now been completed.
- Work on magnet terminations in the Ring are in progress – all magnet terminations in arcs B,C, and D have been completed, including main ring dipole bus connections. Magnet terminations in arc A have been completed except for the main ring dipole bus connections. HEBT ground break to Ring magnet terminations have been completed. Terminations have started on the ring straight section quadrupole magnets and on the extraction kicker magnets.
- Main Ring Dipole Power Supply AC and DC connections are in progress. DC Cables have been run from the basement bus connection to the reference magnet that has been installed in the Ring service Building. AC Cable tray from the outside transformers to the Ring Main Dipole Power supply has been installed.

**HPRF****Ring RF**

- Worked out a plan to align the Final Amplifiers to the Cavities. The amplifiers ride on rails that must be bolted to the floor and grouted. The rails will be installed and amplifiers placed as alignment team manpower permits.
- Waiting for electricians to finish ring tunnel installation.

**LLRF****Cryo Group**

- CM22 back into the LINAC after repair (2 leaks, feedthroughs)
- Supporting work on warm section and RTBT
- Repair work on warm compressor 6 on going
- Cryo operation 24/7
- Continued testing been repaired

**SCL testing progress:**

- Continued testing cryomodels 18, 19, 20 and established limits for all cavities

- Turned on cryomodule 21. Limits on 3 of the 4 cavities still need to be established
- Turned on cryomodule 2 and verified operability
- 73 cavities are now cold and available for testing
- Medium beta average gradient is 17.6 MV/m (28 out of 33 cavities)
- High beta average gradient is 18.0 MV/m (40 out of 48 cavities)
- After extensive reviews, RF permit no longer tied to cryomodule ion pump pressure, but only to window pressure.

## Controls

- A raccoon has recently joined the controls team. He works mainly at night.
- Certification of the Linac PPS was completed for all SCL RF systems. PPS PL:C firmware was upgraded to ControlLogix v13. Control room PPS panels for the HEBT and Linac are being built by DCS, delivery expected first week of June. HEBT field work, PLC program generation, and EPICS work is in progress toward goal of HEBT PPS certification in late June. Beam Shutdown Stations for the HEBT are being built by DCS; delivery is expected the first week of June. Field work is in progress toward completing a Ring access control system in mid July for magnet power supply testing. Work also proceeded on the Target PPS system (TPPS).
- The first target controls OPI was set up and put into operation last week in the target control room.
- The EPICS implementation by ACE Controls for the Target Moderator/Coldbox was reviewed to see what will be needed to integrate it with the rest of the SNS OICS. (Otherwise Integrated Control System.) The application development environment is set up quite differently and will have to be completely reorganized before anything can be saved in our CVS repository. The standard EPICS R3.14.7 is used, however the PV name syntax is not the same so changes will have to be made there. The result is that EDM screens, archive request files and alarm handler configuration files will have to be changes in addition to the EPICS database files.
- We were visited by Javier Sevilla and Phil Cutino from the LCLS project at SLAC, who were interested in seeing how the CF controls have been integrated into the EPICS environment for SNS. They appeared to be favorable impressed, and may use the same approach for the LCLS project. They went on to visit Sverdrup in Tullahoma, who did the CF controls for SNS.
- The HEBT MPS IOC was replaced when the processor was damaged due to a hardware change. The MPS mode mask settings were checked, resulting issues resolved and then rechecked.
- The Hot Spare Ion Source was tested with a new external antenna source. A scientist from DESY has been here all week working with the Ion Source group.

## Beam Diagnostics

- HEBT and SCL BPMs are all installed. Wirings are all complete. Software team is implementing the new LabVIEW code. We expect to start BPM integrations on June-7<sup>th</sup>.
- Fiber optics for all BPM reference line is now fixed and operational.
- 18 X-ray detectors are operational. We are testing the cavity field emission and gap voltage settings using the X-ray detectors.
- Alignment group is working on the laser transport line. They have discovered sections of the transport line needs transverse corrections of ~1 Cm.